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QUARTERLY REPORT

FOR JANUARY THROUGH MARCH 1993

OPERABLE UNIT 1
IM/IRA TREATMENT
FACILITY

PREPARED BY

ENVIRONMENTAL RESTORATION
FACILITIES OPERATIONS MANAGEMENT

EG&G ROCKY FLATS, INC.

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Quarterly Operations Report for January Through March of 1993

at

Operable Unit No. 1 IM/IRA Treatment Facility

1.0 INTRODUCTION

The Operable Unit No. 1 (OU-1) treatment facility located on the 881 Hillside in Building 891 is responsible for treating groundwater collected from the 881 Hillside area. The water is collected in a french drain (similar to an underground dam) located south of Building 891 on the 881 Hillside and pumped to the influent storage tanks located at Building 891. Next, the water is treated with a ultraviolet light/hydrogen peroxide unit and a four step ion-exchange unit to remove volatile organic compounds, uranium, total dissolved solids (TDS), total suspended solids (TSS), cations and anions, and selected metals. After treatment, the water is stored in one of three effluent storage tanks until laboratory sample results verify that the water is acceptable for discharge into the South Interceptor Ditch (SID).

2.0 INFLUENT WATER CHARACTERISTICS

Influent water for OU1 comes from three different sources on the 881 Hillside. These sources include the 881 footing drain, the recovery well CW 001 (located upgradient of the french drain), and the groundwater intercepted by the french drain. Water from each of the sources converges into the french drain and is then pumped to the treatment facility as a composite.

2.1 INFLUENT FLOWRATES

The 881 footing drain seems to be the largest contributor of water into the french drain collection system. The flowrate from the footing drain seems to be directly related to precipitation (refer to attached Chart 1). Heavy snows in late October 1992 and late November 1992 increased the flowrate from 2.5 GPM to 6.0 GPM. Flowrates steadily declined from 6.0 GPM down to 2.9 GPM in mid February due to the lack of precipitation in December and January. However, large flowrates (10 GPM) were again experienced at the end of the quarter. This was associated with four consecutive days of precipitation. A flow meter will be installed in the footing drain in the second quarter in order to more accurately determine the flow contribution from this source.

The recovery well (CW001) is located upgradient of the french drain. A software program was written and added to the Programmable Logic Controller (PLC) to monitor the pump time from this well. Data from this program will be used to calculate pump volumes and the groundwater contribution to the french drain from this well. The groundwater volume in this area is minimal and there was no water pumped out of the well during this quarter. Some flow was encountered, however, early in the second quarter. This data will appear in the second quarter report.

The contribution of groundwater to the flow into the french drain is uncertain at this time. The installation of the flow meter on the 881 footing drain should allow more discreet measurement of the flow from this source. The contribution of groundwater to the system can then be determined by subtracting the recovery well and 881 footing drain flow from the total influent. It is known that the groundwater contribution is rather small compared to the footing drain contribution.

2.2 INFLUENT CONTAMINANTS

Samples of the 881 footing drain water and the french drain composite water were obtained periodically to determine the characterization of the influent waters. No samples were obtained from the recovery well during this quarter due to low water levels. However, enough water was present to obtain samples during the early part of the second quarter. Information on recovery well contaminants will be available in the second quarter report for 1993. Table 1 is a summary of the contaminants that exceeded ARAR's during the first quarter of 1993:

TABLE 1

INFLUENT CONTAMINANTS ABOVE ARAR FOR FIRST QUARTER 1993

DATE	SAMPLE #	LOCA-TION	CONTAMINANT	CONC. mg/l	ARAR mg/l
2/16/93	FT00130ITU1	FOOTD	TDS	501	400
2/16/93	FT00132ITU1	UV INF	TDS	637	400
3/17/93	FT00144ITU1	FOOTD	TDS	517	400
2/16/93	FT00134ITU1	FOOTD	TDS	480	400
2/16/93	FT00136ITU1	UV INF	TDS	613	400
3/17/93	FT00145ITU1	UV INF	PENDING ANALYSIS		
3/17/93	FT00146ITU1	UV INF	PENDING ANALYSIS		
3/22/93	FT00148ITU1	FOOTD	NONE		

- FOOTD - 881 Footing Drain
- UV INF - Influent to UV/Peroxide System

3.0 FRENCH DRAIN MONITORING WELLS

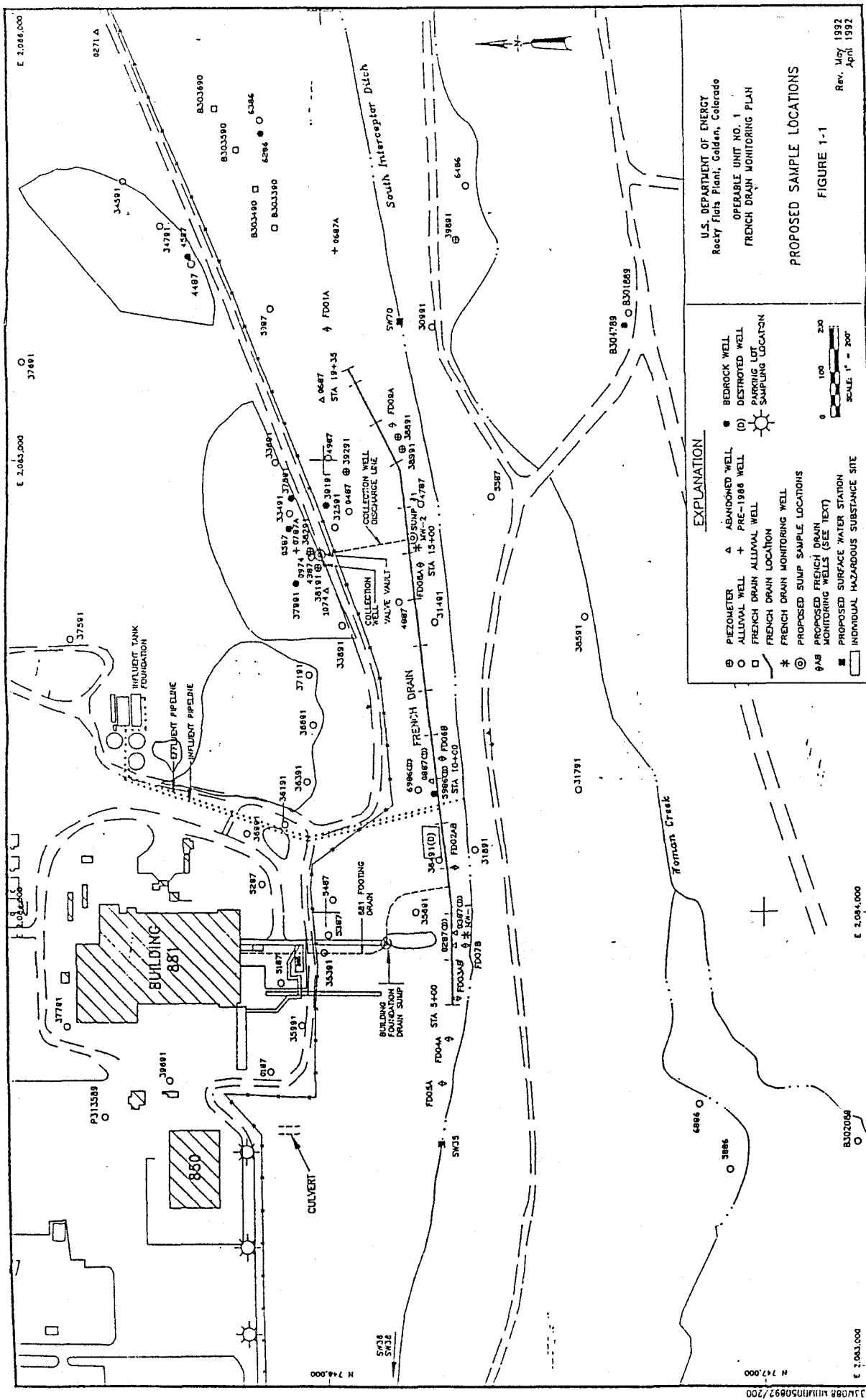
The French Drain Performance Monitoring Plan (FDPMP) requires additional sample data for monitoring french drain performance. The FDPMP requires groundwater level measurements of designated french drain monitoring wells (10092-11092, 39991, 45391, 4887, 35691, 31491, and 4787). Additionally, quarterly water quality sampling of the wells is required.

3.1 WATER LEVELS

Groundwater level measurements were obtained from 15-September 1992 through 26-March 1993 (see Appendix A for summary). Eleven of fourteen downgradient wells were found to be dry or exhibited water levels that are dropping consistently over time. Refer to Drawing Figure 1-1 for well locations and Table 2 for correlation of well numbers. Wells 39991, 45391, and 10492 exhibited measurable water levels. Well 39991 (MW-1) is believed to have been damaged or collapsed and is therefore not considered valid data at this time. Well 10492 is located near the western termination of the french drain and may be subject to groundwater flow from areas west of the drain. Well 45391 (MW-2), requires further evaluation to determine a cause for unexplained groundwater fluctuations found at this location, and is therefore inappropriate for discussions of the french drains' effectiveness. The two wells upgradient of the french drain (35691 and 04887) remain wet as expected (35691 has slightly lower water levels and 04887 has significantly higher water levels compared to pre-construction water level measurements).

TABLE 2

REFERENCED WELL NUMBER	WELL NUMBER
FD01A (Alluvial)	10092
FD02A (Alluvial)	10192
FD02B (Bedrock)	10292
FD03A (Alluvial)	10393
FD03B (Bedrock)	10492
FD04A (Alluvial)	10592
FD05A (Alluvial)	10692
FD06B (Bedrock)	10792
FD07B (Bedrock)	10892
FD08A (Alluvial)	10992
FD09A (Alluvial)	11092
MW01 (Alluvial)	39991
MW02 (Alluvial)	45391



3.2 CONTAMINANTS DETECTED

French Drain Monitoring wells were sampled quarterly during the period 15- September 1992 through 26-March 1993 for pesticides, inorganics, volatiles, semi-volatiles, and radionuclides (see Appendix A for summary). Analysis of this data shows minimal presence of target contaminants in the downgradient wells (not all data has been validated). The presence of somewhat elevated levels of iron, manganese, and selenium were detected at well locations 10692 (located west of the western termination of french drain) and 10492 (located downgradient of french drain near western termination). However, these are naturally occurring elements, and the detected levels in the water seem to fall between dissolved and total background estimates; and would therefore not be considered be contaminants. In addition, water quality analysis also revealed the presence of sulfates and TDS at these locations (including 10592). The presence of volatiles and semi-volatiles (primarily low level) was detected at 10092, 10492, 10592, 10692, 10792, and 11092. Benzene compounds (including toluene = 30 ug/l), carbon disulfide (= 7 ug/l), methylene chloride (= 3 ug/l), and tetrachloroethene (.5 ug/l) were the primary contaminants found in the water. Also, unknown volatile or semivolatile compounds were found at 10492, 10592, 10692, and 10792. These compounds will have to be identified with additional analysis during the next sampling event. Volatile compounds that were identified during sampling were below ARAR's for those compounds having ARAR's.

As discussed with DOE, the ground water monitoring program has detected indications of slump block movement on the 881 Hillside. Within the last quarter, wells 07191 and 35691 have both bent sufficiently to require smaller bailers to obtain samples. No indications of external damage were noted, and it is felt that the bending is due to pressure of moving slump blocks. Since more information is necessary to further evaluate this situation, the Hillside movement will be tracked via survey control points in order to obtain quantitative data.

4.0 800 AREA PARKING LOT SURFACE WATER MONITORING

Equipment to monitor the surface water runoff from the 800 area parking lot onto the 881 Hillside is being purchased. Installation will be completed in the latter part of the second quarter, 1993. Surface flow measurement data will be available for the Third Quarter Report, 1993.

5.0 TREATMENT FACILITY PERFORMANCE

The treatment system performance is measured by various criteria. Quantity of water treated, contamination destruction or removal efficiency, waste generation, operating costs, chemical usage, and system reliability.

5.1 QUANTITY OF WATER TREATED

A total of 205,000 gallons of influent water was treated and 100,000 gallons of treated effluent

was released to the South Interceptor Ditch during the first quarter of 1993. The treatment totals from start-up to the end of the first quarter 1993 are 1,000,300 gallons treated and 800,500 gallons of treated water discharged. Significantly higher flowrates were experienced over the last few days of the first quarter. It is anticipated that this trend will continue through the beginning of the second quarter.

5.2 CONTAMINATION DESTRUCTION/REMOVAL EFFICIENCY

All treated discharged water met ARAR's for the first quarter of 1993. However, treated water in effluent tank T-206 is above the ARAR for Total Dissolved Solids (TDS). This water is being retreated and will meet ARAR's before being discharged.

5.3 QUANTITY OF CHEMICALS USED

Approximately 2,000 gallons of hydrochloric acid, 1000 gallons of sodium hydroxide, and 75 gallons of hydrogen peroxide were used during the first quarter of 1993. Chemical usage during the second quarter should be somewhat greater due to the increasing regeneration/neutralization activities associated with increased influent flow.

5.4 POWER USAGE

The resolution of the meter currently used to measure the power usage at the Treatment Facility is too low to be able to accurately obtain measurements over short time spans. A higher resolution meter will be installed in order to obtain accurate data about power consumption at the treatment facility.

5.5 WASTE GENERATION

Waste generated at the treatment facility includes sock filters and neutralized regenerant water. Less than one 55 gallon drum of sock filters has been collected over the span of one year of operation at the facility. Neutralized regenerant waste water is shipped to the building 374 evaporator for disposal. Five truckloads of water totaling 16,000 gallons were sent to the evaporator during the first quarter of 1993.

5.6 OPERATING COSTS

Subcontracted operating costs during the first quarter totaled \$146,000 (including chemical costs). A portion (\$27,000) of these costs were incurred due to the training of a new subcontractor for the operation of the treatment facility. Costs associated with the power usage at the facility are not currently known.

5.7 WATER FROM OTHER SOURCES

Approximately 4,000 gallons of water from the Main Decontamination Facility was received and treated at Building 891. The water had low levels of VOC's (Chloroform = 10 ug/l, Acetone = 20 ug/l, Carbon Tetrachloride = 16 ug/l, trichloroethene = 24 ug/l, methylene chloride = 10 ug/l, and toluene = 7 ug/l) that exceeded the 374 Evaporator influent limits.

5.8 MAINTENANCE PROBLEMS

No unusual maintenance problems were encountered during this reporting period.

6.0 WETLANDS MITIGATION

Wetlands mitigation activities will be implemented during the second quarter of 1993. Bentonite will be spread in the wetlands area to decrease the permeability of the area in April 1993. Revegetation of the wetlands will begin in May and will include the planting of willows, cattails, and bulrush.

7.0 TREATMENT FACILITY SAMPLING

Water samples are taken at OU-1 to characterize the influent groundwater, assure that neutralization water from regeneration of the ion exchange system is acceptable for the 374 Evaporator, monitor the ion exchange resin performance, and to verify that all discharge standards are met. All samples that must meet EPA and CDH criteria are sent to independent, off-site laboratories. Water that is sent to the 374 Evaporator is analyzed for pH and gross alpha in the 881 General Labs. All discharged water met the required ARAR's. A summary of the samples taken during this recording period can be found in Table 3, 1993 FIRST QUARTER SAMPLES FOR OU-1 IM/IRA.

8.0 ENVIRONMENTAL COMPLIANCE

The OU-1 IM/IRA Groundwater Treatment Facility met all discharge standards last quarter for discharged water. No releases of hazardous materials or wastes to the environment occurred.

A real-time gamma analyzer was installed on the system effluent to monitor the system radiological removal efficiency. The new system is presently being tested.

The purchase and installation of an in-line gas chromatograph is currently in progress. The installation of the GC is scheduled to be completed in August 1993.

Table 3

1993 FIRST QUARTER SAMPLES FOR OU-1 IM/IRA

SAMPLE #	LOCATION	CONSTITUENT	STATUS
FT00126ITU1	Neutralization tank	Rad screen	Accept. for 374 Evap.
FT00127ITU1	Neutralization tank	Rad screen	Accept. for 374 Evap.
FT00128ITU1	Neutralization tank	Rad screen	Accept. for 374 Evap.
FT00129ITU1	Neutralization tank	Rad screen	Accept. for 374 Evap.
F000130ITU1	881 Footing Drain	VOA, Mtls, WQ, Rads	Accept. for 374 Evap.
F000131ITU1	Sample not sent	Sample not sent	Sample not sent
FT00132ITU1	UV Influent	VOA, Mtls, WQ, Rads	On file
FT00133ITU1	Neutralization tank	VOA, Mtls, WQ, Rads	On file
FT00134ITU1	881 Footing Drain	FT00130ITU1 Dupl.	On file
FT00135ITU1	Blank	VOA, Mtls, WQ, Rads	On file
F000136ITU1	UV Influent	FT00132ITU1 Dupl.	On file
FT00137ITU1	Blank	VOA, Mtls, WQ, Rads	On file
F000138ITU1	Neutralization tank	FT00133ITU1 Dupl.	On file
F000139ITU1	Blank	VOA, Mtls, WQ, Rads	On file
F000140ITU1	Effluent tank T-206	VOA, Mtls, WQ, Rads	On file
F000141ITU1	IX Influent	VOA, Rads, NO ₂ /NO ₃	Lab Analysis Pending
F000142ITU1	IX-1 Effluent	VOA, Rads, NO ₂ /NO ₃	Lab Analysis Pending
F000143ITU1	Neutralization tank	Rad screen	Accept. for 374 Evap.
F000144ITU1	881 Footing Drain	VOA, Mtls, WQ, Rads	On file
FT00145ITU1	UV Influent	VOA, Mtls, WQ, Rads	Lab Analysis Pending
FT00146ITU1	UV Influent	FT00145ITU1 Dupl.	Lab Analysis Pending
F000147ITU1	Blank	VOA, Mtls, WQ, Rads	Lab Analysis Pending
FT00148ITU1	881 Footing Drain	VOA, BNA/PCB/Pest, Rad screen	On file
FT00149ITU1	Neutralization tank	Rad screen	Accept. for 374 Evap.
FT00150ITU1	Neutralization tank	Rad screen	Accept. for 374 Evap.

8.1 REPORTS/CORRESPONDENCE

The following documents were reviewed and modified during this reporting period:

- OU-1 Sampling and Analysis Plan (SAP) (Final Jan. 18), Rev. 1
- CH₂M Hill Site Specific Health and Safety Plan (Final Feb. 5, 1993), Rev. 1

9.0 ANTICIPATED OPERATIONS FOR NEXT QUARTER

Typically, the months of April and May bring more precipitation, causing increased groundwater flow into the collection gallery. During the second quarter last year, operations were extended to 10-hour days, 7-days per week. Operating hours will be increased accordingly to assure that all groundwater is collected and treated.

The operation of the OU1 Treatment Facility has been subcontracted to Resource Technologies Group (RTG). The changeover from IT to RTG will take place on April 30, 1993 after RTG has completed a six week period of on-the-job training.

10.0 SUMMARY/CONCLUSIONS

A total of 205,000 gallons of water was treated and 100,000 gallons were discharged during the quarter. The treatment totals to date are 1,000,300 gallons treated and 800,500 gallons of treated water discharged.

Steps are underway to upgrade the treatment system's real-time analysis capabilities by adding an in-line gas chromatograph to monitor treated effluent for organics.

Data obtained from sampling and water level measurements seems to indicate that the french drain is performing adequately. Wells downgradient of the french drain indicate that the system is preventing the flow of groundwater in this area from reaching the South Interceptor Ditch. Further testing and evaluation will have to be performed in order to understand the fluctuations found in well 45391.

Analysis of sample data showed very little contamination in the downgradient wells of the french drain. Somewhat elevated levels of iron, manganese, and selenium were discovered; primarily near the west end of the french drain. However, these elements are natural and probably not of concern. Identified contaminants found on the downgradient side of the french drain were primarily low level. TIC analysis will have to be performed in order to identify unknown volatile compounds that were found in several monitoring wells (two downgradient and two west of french drain) on the hillside.

The results obtained from data collection up to this point have been somewhat helpful in developing initial ideas about the performance of the overall treatment system. However, in many areas additional data is needed in order to perform proper statistical analysis and to draw more definite conclusions.

APPENDIX A

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[illegible]

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[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

WELL NUMBER:		35691			
WELL DEPTH (TO GROUND):		303. FEET			
NOTE: WATER DEPTH IS TO TOP OF CASING (ABOUT 2.4 FEET ABOVE GROUND.)					
WATER LEVELS					
DATE	WATER DEPTH				
1/9/92	12.05				
2/4/92	11.98				
2/17/92	17.75				
3/24/92	16.31				
4/6/92	16.03				
5/1/92	16.01				
5/13/92	16.24				
7/1/92	16.45				
8/10/92	16.83				
10/1/92	17.13				
11/5/92	17.41				
1/20/93	17.98				
3/15/93	18.54				